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10/649,844	08/26/2003	Michael A. Berger	11148/1	7030

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EXAMINER
PAPPAS, PETER

ART UNIT	PAPER NUMBER
2628	

DATE MAILED: 08/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/649,844	BERGER, MICHAEL A.	
	Examiner	Art Unit	
	Peter-Anthony Pappas	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,21-35,37-39 and 47-53* is/are rejected.

7)☒ Claim(s) *10,14-20,36 and 40-46* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 10, 14-20, 36 and 40-46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 24 and 50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The language "...combines the displacement vectors... with the position of the control point by vector sum" is considered unclear, because a vector sum is the result of adding two or more vectors together via vector addition and said control point is not considered a vector.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 8, 9, 11, 13, 21, 22, 25-31, 35, 37, 39, 47, 48 and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Menache (U.S. Patent No. 7, 068, 277 B2) in view of Foley et al. (Computer Graphics: Principles and Practice).

3. In regards to claim 1 Menache teaches that the present invention relates to 3D graphics and animation and more particularly to a system and method for animating a digital facial model based on biomechanical constraints derived from human anatomy (column 1, lines 15-18). Said system, for animating facial motion, comprises an animation processor adapted to generate 3D graphical images and a facial performance processing system operative with the animation processor to generate a 3D digital model of an actor's face and overlay a virtual muscle structure onto the digital model. The virtual muscle structure includes plural muscle vectors (displacement vectors) that each respectively define a plurality of vertices (control points) along a surface of the digital model in a direction corresponding to that of actual facial muscles. The facial performance processing system is responsive to an input reflecting selective actuation of at least one of the plural muscle vectors to thereby reposition corresponding ones of the plurality of vertices and re-generate the digital model in a manner that simulates facial motion. The muscle vectors further include an origin point defining a rigid connection of the muscle vector with an underlying structure corresponding to actual cranial tissue, an insertion point defining a connection of the muscle vector with an overlying surface corresponding to actual skin and interconnection points with other ones of the plural muscle vectors (column 3, lines 9-18). The muscle vectors are described in corresponding muscle definition files 32 (column 7, lines 23-24). It is noted said plurality of muscle vectors stored in said muscle definition files 32 are considered to read on displacement fields.

Menache teaches user selection of a pose wherein said selection comprises a combination of plural ones of the plural muscle vectors and at least one associated compression value (intensity variable) to be applied to the plural muscle vectors. This approach enables a user to control groups of muscles to form expressions, such as happy, sad, worried, thoughtful, angry, and others (column 3, lines 39-42).

Menache teaches that as with the muscle control module 120, these steps may appear to the user as being performed in real time, so that the user can observe on the screen physical changes to the facial structure 50 in response to variations of the compression value (column 8, lines 63-67). It is implicitly taught by Menache that the results of said system are rendered and displayed on a given display device as illustrated in Fig. 1 (element 14).

Menache fails to explicitly teach storing the rendered 2D image. Foley et al. teaches that a frame buffer is part of conventional raster-display systems and used for the storage of rendered graphics information which are to be displayed (p. 166, § 4.3.1; p. 856, § 18.1). It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the teachings of Foley et al. into the display system taught by Menache, because through such incorporation it would provide a conventional system for the display of information which is widely accepted, thus allowing for said system to be more easily implemented and more widely accepted.

Official Notice is taken that both the concept and advantages of utilizing a conventional 2D display device, such as a CRT or LCD, for the display of graphics information in a given computer graphics system are well known and expected in the

art. It would have been obvious to one skilled in the art, at the time of the applicant's invention, to utilize a CRT or LCD for the display of information in the system taught by Menache, because Menache teaches the use of a display for the input and output of various graphics information and by utilizing a conventional display, such as a CRT or LCD, said system would not require the use of specialized hardware for displaying said information, thus making said system easier to implemented and more widely accepted.

It is noted animation processor 12 in combination with facial performance control 20 are considered to read on a facial reconstruction arrangement, an intensity generator, a deformation unit, a rendering unit and a video output subsystem.

4. In regards to claim 2 Menache teaches wherein the base surface model represents a shape of the face in a neutral relaxed pose (column 9, lines 42-49).

5. In regards to claim 3 Menache teaches that motion capture processor 42 processes 2D images received from the motion capture cameras 44_1-44_N to produce a 3D digital representation of the captured motion. Particularly, the motion capture processor 42 receives the 2D data from each camera and saves the data in the form of multiple data files. The 2D data files are then resolved into a single set of 3D coordinates that are linked together in the form of trajectory files representing movement of individual markers (column 5, lines 64-67; column 8, lines 1-6). It is noted cameras 44_1-44_N in combination with motion capture processor 42 are considered to read on a surface acquisition arrangement. Menache further teaches that the motion capture data for a particular actor may be used to animate a character having substantially different facial features (column 10, lines 11-13).

6. In regards to claim 4 Menache teaches that the facial performance processing system is further operative to define facial marker locations (3D points on a given subject's face) corresponding to the plurality of vertices. Moreover, the facial performance processing system is further operative to generate a template having holes corresponding to the defined facial marker locations for use in marking the locations onto the actor's face (column 3, lines 54-60). Fig. 3 illustrates a facial model (topological model) including designated motion capture marker locations corresponding to facial musculature structure (column 4, lines 9-11).

7. In regards to claim 8 the rationale disclosed in the rejection of claim 2 is incorporated herein. Menache further teaches that during a subsequent performance of the default pose, the motion capture calibration utility 170 receives the motion capture data in step 174. This motion capture data is then compared to the default pose file 36 for the actor (column 9, lines 56-59).

8. In regards to claim 9 Menache teaches user selection of a pose wherein said selection comprises a combination of plural ones of the plural muscle vectors and at least one associated compression value (intensity variable) to be applied to the plural muscle vectors. This approach enables a user to control groups of muscles to form expressions, such as happy, sad, worried, thoughtful, angry, and others (column 3, lines 39-42). Menache teaches that a graphical user interface may provide a slide bar or like tool that can be moved on the computer screen using a pointing device, e.g., mouse. Alternatively, the user may enter a number corresponding to the desired compression value into an appropriate field. Or, in another embodiment, the user may click on and

drag the muscle vector, thereby performing the muscle group selection and compression value selection in a single step (column 7, lines 64-67; column 8, lines 1-4).

Menache teaches that a uniform compression value may not be applied to each muscle group. Instead, the compression value applied to individual muscle groups may vary substantially across the compression range of the pose. For example, at one end of the compression range for a happy pose (e.g., mildly happy), only the cheek muscles may be compressed, while at the other end of the range (e.g., extremely happy), many muscle groups may be compressed (column 8, lines 44-47).

It is noted that the respective claim language is silent as to whether an "increasing intensity value" is increased towards a positive or negative value (i.e. positive or negative infinity, respectively).

9. In regards to claim 11 Menache teaches geometrically aligning the surface models to minimize differences in head position (column 9, lines 37-67; column 9, lines 1-23). It is noted said animation processor 12 in combination with facial performance control 20 are considered to read on a surface registration unit.

10. In regards to claim 13 the rationale disclosed in the rejection of claim 1 is incorporated herein (Menache: column 3, lines 9-18).

11. In regards to claim 21 the rationale disclosed in the rejection of claim 1 is incorporated herein (Menache: column 3, lines 39-42; column 8, lines 63-67). Menache further teaches that a graphical user interface may provide a slide bar or like tool that can be moved on the computer screen using a pointing device, e.g., mouse.

Alternatively, the user may enter a number corresponding to the desired compression value into an appropriate field. Or, in another embodiment, the user may click on and drag the muscle vector, thereby performing the muscle group selection and compression value selection in a single step (column 7, lines 64-67; column 8, lines 1-4). It is implicitly taught that said steps, which include the assignment of compression values by a given user, are performed over a given period of time and thus said values which result from said assignment are considered to be based on time.

12. In regards to claim 22 the rationale disclosed in the rejection of claim 1 is incorporated herein (Menache: column 3, lines 39-42; column 8, lines 63-67). Menache further teaches that the graphical user interface may provide a slide bar or like tool that can be moved on the computer screen using a pointing device, e.g., mouse. Alternatively, the user may enter a number corresponding to the desired compression value into an appropriate field. Or, in another embodiment, the user may click on and drag the muscle vector, thereby performing the muscle group selection and compression value selection in a single step (column 7, lines 64-67; column 8, lines 1-4).

13. In regards to claim 25 Menache teaches that the facial structure 50 represents a sub-facie structure, also referred to as a "mug", that lies below the skin surface. An outer surface tissue having desired texture and color will be applied to this mug as part of a subsequent animation process to produce an animated character (column 6, lines 32-37).

14. In regards to claim 26 the rationale disclosed in the rejection of claim 1 is incorporated herein (Foley et al.: p. 166, § 4.3.1). It is noted a bitmap is considered to read on a pixmap.

15. In regards to claim 27 the rationale disclosed in the rejection of claim 1 is incorporated herein.

16. In regards to claim 28 the rationale disclosed in the rejection of claim 2 is incorporated herein.

17. In regards to claim 29 the rationale disclosed in the rejection of claim 3 is incorporated herein.

18. In regards to claim 30 the rationale disclosed in the rejection of claim 8 is incorporated herein.

19. In regards to claim 31 the rationale disclosed in the rejection of claim 4 is incorporated herein.

20. In regards to claim 35 the rationale disclosed in the rejection of claim 9 is incorporated herein.

21. In regards to claim 37 the rationale disclosed in the rejection of claim 11 is incorporated herein.

22. In regards to claim 39 the rationale disclosed in the rejection of claim 13 is incorporated herein.

23. In regards to claim 47 the rationale disclosed in the rejection of claim 21 is incorporated herein.

24. In regards to claim 48 the rationale disclosed in the rejection of claim 22 is incorporated herein.

25. In regards to claim 51 the rationale disclosed in the rejection of claim 25 is incorporated herein.

26. In regards to claim 52 the rationale disclosed in the rejection of claim 26 is incorporated herein.

27. In regards to claim 53 the rationale disclosed in the rejection of claim 1 is incorporated herein.

28. Claims 5-7 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Menache (U.S. Patent No. 7, 068, 277 B2) in view of Foley et al. (Computer Graphics: Principles and Practice), as applied to claims 1-4, 8, 9, 11, 13, 21, 22, 25-31, 35, 37, 39, 47, 48 and 51-53, in view of Wang et al. (An Overview of Geometric Modeling Using Active Sensing).

29. In regards to claim 5 Menache and Foley et al. fail to explicitly teach utilizing active sensing for surface measurement. Wang et al. teaches utilizing active sensing for surface measurement (Abstract). It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the teachings of Wang et al. into the system taught by Menache and Foley et al., because through such incorporation there are advantages gained in adopting active structured light projection such as the extra degree of freedom in manipulating the light and the sensing configuration helps simplify image acquisition and the ensuing image analysis (Wang et al.: p. 11, Concluding Remarks).

30. In regards to claim 6 Wang et al. teaches wherein the active sensing projects a grid pattern for surface measurement (Abstract; p. 6-7, § Point and Line Patterns). The motivation disclosed in the rejection of claim 5 is incorporated herein.

31. In regards to claim 7 Wang et al. teaches wherein said active sensing projects a pattern of parallel strips for surface measurement (Abstract; p. 6-7, § Point and Line Patterns). The motivation disclosed in the rejection of claim 5 is incorporated herein.

32. In regards to claim 32 the rationale disclosed in the rejection of claim 5 is incorporated herein.

33. In regards to claim 33 the rationale disclosed in the rejection of claim 6 is incorporated herein.

34. In regards to claim 34 the rationale disclosed in the rejection of claim 7 is incorporated herein.

35. Claims 12 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Menache (U.S. Patent No. 7, 068, 277 B2) and Foley et al. (Computer Graphics: Principles and Practice), as applied to claims 1-4, 8, 9, 11, 13, 21, 22, 25-31, 35, 37, 39, 47, 48 and 51-53, in view of Turk et al. (Zippered Polygon Meshes from Range Images).

36. In regards to claim 12 Menache and Foley et al. fail to explicitly teach an iterative closest point technique to geometrically align the surface models. Turk et al. teaches an iterative closest point technique to geometrically align the surface models (p. 1, § Abstract; p. 3-4, § 4.1 Iterated Closest-Point Algorithm; p.4, § 4.2 Constraints on ICP). It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the teachings of Turk et al. into the system taught by Menache

and Foley et al., because scan acquired with the system taught by Turk et al. are combined one at a time which allows said system to acquire and combine large numbers of scans with minimal storage overhead (p. 1, § Abstract), thus allowing for information to be stored more efficiently.

37. In regards to claim 38 the rationale disclosed in the rejection of claim 12 is incorporated herein.

38. Claims 23 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Menache (U.S. Patent No. 7, 068, 277 B2) in view of Foley et al. (Computer Graphics: Principles and Practice), as applied to claims 1-4, 8, 9, 11, 13, 21, 22, 25-31, 35, 37, 39, 47, 48 and 51-53, in view of Rabiner et al. (U.S. Patent No. 4, 092, 493).

39. In regards to claim 23 Menache and Foley et al. fail to explicitly teach wherein the current intensity values for the displacement fields are supplied by a speech animation program. Rabiner et al. teaches a system that relates to speech recognition and more particularly to an arrangement for recognizing prescribed speech segments in continuous speech. In communication, data processing and control systems, it is often desirable to utilize speech as direct input for data, commands, or other information. Speech input arrangements may be utilized to record transactions, to record and request telephone call information, to control machine tools, or to permit a person to interact with data processing and control equipment without diverting his attention from other activity (column 1, lines 5-15).

It would have been obvious to one skilled in the art, at the time of the applicant's invention, to incorporate the teaching of Rabiner et al. into the system taught by

Menache and Foley et al., because through such incorporation it would provide an additional means for a given user to enter information into said system without having to divert their attention from other activity (Rabiner et al.: column 1, lines 14-15).

40. In regards to claim 49 the rationale disclosed in the rejection of claim 23 is incorporated herein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 571-272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Peter-Anthony Pappas

Examiner
Art Unit 2628

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